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NAVY UNDERWATER SOUND REFERENCE LAB ORLANDO FL
MEASUREMENTS ON GOODYEAR ELASTOMER-COATED REINFORCED PANELS. (U)
FEB 64

F/G 11/10

UNCLASSIFIED

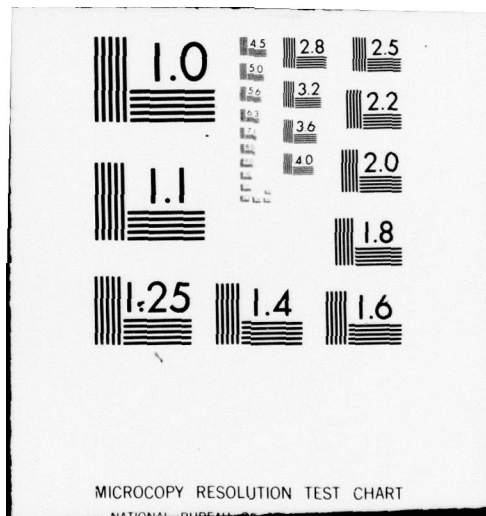
USRL-CALIBRATION-2131

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Measurements on

Goodyear Elastomer-Coated Reinforced Panels

⑫ 12p.

⑪

3 February 1964

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CALIBRATION REPORT No. 2131

Subj: Goodyear elastomer-coated reinforced panels; measurements on

Ref: (a) Goodyear Aerospace Corp ltr WS-4916 of 15 Nov 1963 to BUSHIPS
(b) BUSHIPS ltr NObsr 91065 Ser 688E-537 of 16 Dec 1963

Encl: (1) Tables 1 through 10

Transmission loss measurements were made for

1. Seven elastomer-coated cord-reinforced panels, one elastomer-coated metal-reinforced panel, and one gum-rubber panel were evaluated for the Goodyear Aerospace Corp. as requested in reference (a) and authorized in reference (b) in connection with contract NObsr 91065. The 6 x 6-ft square panels are described in Table 1, enclosure (1).

2. The transmission loss of each panel was measured at 5° intervals by an "insertion loss" method at orientations from 0° to 45° measured from a line normal to the test panel at the center. The results of these measurements are shown in Tables 2 through 10. For measurements of this type the accuracy is ± 0.2 dB. The dimensions of the panels allowed the use of continuous-wave sound at low frequencies, where pulsing is not practical. *deg.*

3. At the request of Mr. Theodore Underwood, Goodyear representative, the transmission loss was measured on panel serial 377-3 with each side of the panel facing the sound source. The difference was negligible. *substantiated.*

4. Reflection from panel ~~serial 265-6~~ ^{one}, which had a low transmission loss at all frequencies and angles, and ~~serial 377-3~~ ^{one} which had the highest transmission loss per inch thickness of the cord-reinforced materials, was measured over the frequency range 5 to 20 kc by both continuous-wave and pulsing techniques. The results by the two methods were substantially the same, and the reflection varied from 2% of incident-sound intensity for panel ~~265-6~~ to 7% for panel ~~377-3~~. Measurements were limited to normal incidence and frequencies above 5 kc by panel size. The reflection did not appear to be a function of frequency. *The second* *the first*

5. Reflection measurements on the remaining seven panels could not be made in the time scheduled for these tests, and because of other priority work.

6. On the basis of paragraph 3 of reference (b) the data reported here are unclassified.

Charles R. Bobo
CHARLES R. BOBO
Acoustic Calibration Division

Copy to:
BUSHIPS (Code 688E)(2)
Goodyear Aerospace Corp. (H. Boyd)(2)
Goodyear Tire and Rubber Co (T. Underwood)(1)
USRL (200)(1)

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DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

Table 1

PANEL DESCRIPTION*

Goodyear Elastomer Panels

Panel No.	Thickness (inches)	Reinforcement
265-0**	1-3/4	none
373-3	1-7/8	cord
374-2	1-3/16	cord
374-3	1-3/4	cord
374-4	2-5/16	cord
375-3	1-3/4	cord
376-3	1-5/8	cord
377-3	1-1/4	cord
378-3	7/8	cord and steel

* Type of elastomer and of cord not indicated by manufacturer.

** Stated to be gum rubber.

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Table 2

TRANSMISSION LOSS
(in decibels)

Goodyear Elastomer Panel No. 265-0
Water temp: 15°C

Freq (kc)	Angle of Incidence
	0-45°
2	0.7
3	0.7
4	0.7
5	0.7
6	0.9
7	0.9
8	1.0
9	0.8
10	0.9
12	1.0
14	0.6
16	0.9
18	0.8
20	0.8

Table 3

TRANSMISSION LOSS
(in decibels)

Goodyear Reinforced Elastomer Panel No. 373-3
Water temp: 15°C

Freq (kc)	Angle of Incidence				
	0-25°	30°	35°	40°	45°
2	1.0	1.0	1.0	1.0	1.0
3	1.0	1.0	1.0	1.0	1.2
4	1.0	1.0	1.2	1.5	1.7
5	1.2	1.2	1.5	1.7	2.1
6	1.3	1.3	1.7	1.9	2.5
7	1.6	1.6	1.9	2.2	2.4
8	1.7	1.7	2.1	2.3	2.6
9	1.9	1.9	2.3	2.6	3.0
10	1.8	1.8	1.9	2.3	2.9
12	1.5	1.8	2.0	2.5	3.2
14	1.7	1.9	2.1	2.5	3.4
16	1.9	1.9	2.3	3.1	3.7
18	1.9	2.2	2.6	3.5	4.5
20	2.0	2.4	3.0	4.1	5.3

Table 4

TRANSMISSION LOSS
(in decibels)

Goodyear Reinforced Elastomer Panel No. 374-2
Water temp: 15°C

Freq (kc)	Angle of Incidence				
	0-25°	30°	35°	40°	45°
2	0.8	0.8	0.8	0.8	0.8
3	0.8	0.8	0.8	0.8	0.8
4	0.8	0.8	0.8	0.8	0.9
5	0.8	0.8	1.1	1.3	1.4
6	1.2	1.2	1.4	1.7	1.9
7	1.2	1.2	1.5	1.7	2.0
8	1.5	1.5	1.7	1.7	1.9
9	1.5	1.5	1.7	1.8	1.9
10	1.4	1.5	1.7	1.9	2.1
12	1.4	1.6	2.1	2.3	2.5
14	1.0	1.2	1.7	1.9	2.2
16	1.2	1.4	1.5	2.0	2.3
18	1.0	1.2	1.8	2.2	3.0
20	1.3	1.5	1.8	2.5	3.1

Table 5

TRANSMISSION LOSS
(in decibels)

Goodyear Reinforced Elastomer Panel No. 374-3
Water temp: 15°C

Freq (kc)	Angle of Incidence					
	0-20°	25°	30°	35°	40°	45°
2	1.0	1.0	1.1	1.4	1.5	1.6
3	1.0	1.0	1.2	1.4	1.5	1.6
4	1.0	1.0	1.2	1.4	1.5	1.7
5	1.0	1.3	1.3	1.7	1.8	2.1
6	1.2	1.4	1.6	2.0	2.2	2.5
7	1.4	1.6	1.8	2.3	2.4	2.7
8	1.7	2.3	2.4	2.6	2.8	3.2
9	1.8	1.8	1.9	2.3	2.5	3.2
10	1.7	1.8	1.9	2.2	2.3	2.5
12	1.2	1.7	1.9	2.4	2.4	2.8
14	1.2	1.5	1.7	2.3	2.5	3.1
16	1.7	1.7	2.2	2.5	2.9	3.6
18	1.7	1.8	2.4	2.8	3.5	4.2
20	2.1	2.2	2.6	3.1	3.7	4.5

Table 6

TRANSMISSION LOSS
(in decibels)

Goodyear Reinforced Elastomer Panel No. 374-4
Water temp: 15°C

Freq (kc)	Angle of Incidence					
	0-20°	25°	30°	35°	40°	45°
2	1.0	1.0	1.0	1.1	1.2	1.3
3	1.0	1.0	1.0	1.2	1.4	1.6
4	1.0	1.2	1.3	1.6	2.0	2.2
5	1.0	1.5	1.7	2.0	2.5	2.8
6	1.4	1.8	2.0	2.4	2.8	3.2
7	1.7	2.0	2.2	2.6	2.9	3.4
8	1.9	2.1	2.2	2.6	3.1	3.4
9	2.1	2.4	2.5	2.8	3.2	3.7
10	2.3	2.6	2.8	2.9	3.3	3.9
12	1.6	2.2	2.5	2.9	3.4	4.0
14	1.3	1.7	2.0	2.6	3.3	4.1
16	1.4	1.8	2.2	2.5	3.4	4.4
18	1.8	2.3	2.7	3.4	4.1	5.0
20	2.1	2.5	2.9	3.7	5.0	5.9

Table 7

TRANSMISSION LOSS
(in decibels)

Goodyear Reinforced Elastomer Panel No. 375-3
Water temp: 15°C

Freq (kc)	Angle of Incidence				
	0-25°	30°	35°	40°	45°
2	0.5	0.5	0.6	0.6	0.6
3	0.5	0.5	0.7	0.7	0.8
4	0.5	0.6	0.8	0.8	0.9
5	0.6	0.6	0.8	1.0	1.2
6	0.7	0.8	0.8	1.0	1.2
7	0.8	0.9	1.0	1.2	1.4
8	1.0	1.1	1.1	1.3	1.5
9	1.3	1.4	1.5	1.6	1.8
10	0.8	0.9	1.1	1.3	1.8
12	0.8	1.0	1.3	1.7	2.2
14	0.7	1.0	1.3	1.9	2.6
16	0.7	1.3	1.6	2.4	3.5
18	0.8	1.4	1.7	2.4	3.5
20	1.2	1.8	2.0	2.9	3.8

Table 8

TRANSMISSION LOSS
(in decibels)

Goodyear Reinforced Elastomer Panel No. 376-3
Water temp: 15°C

Freq (kc)	Angle of Incidence			
	0-30°	35°	40°	45°
2	0.6	0.7	0.7	0.8
3	0.6	0.7	0.7	0.9
4	0.7	0.8	0.9	1.1
5	0.7	0.9	1.1	1.2
6	0.9	1.0	1.2	1.6
7	0.9	1.1	1.3	1.6
8	1.0	1.3	1.4	1.7
9	1.0	1.4	1.6	1.8
10	1.1	1.4	1.6	1.8
12	1.1	1.4	1.6	2.0
14	1.1	1.4	1.5	2.1
16	1.3	1.6	2.0	2.4
18	1.3	1.6	2.0	2.6
20	1.4	1.7	2.4	3.0

Table 9

TRANSMISSION LOSS
(in decibels)

Goodyear Reinforced Elastomer Panel No. 377-3
Water temp: 15°C

Freq (kc)	Angle of Incidence					
	0-20°	25°	30°	35°	40°	45°
2	0.7	0.7	0.7	0.8	0.8	1.0
3	0.7	0.7	0.7	0.9	1.0	1.0
4	0.7	0.7	0.9	1.2	1.4	1.6
5	0.8	0.8	1.2	1.4	1.6	1.9
6	1.3	1.3	1.5	1.8	2.4	2.7
7	1.5	1.5	1.7	2.1	2.3	2.7
8	1.6	1.6	1.9	2.8	2.8	3.1
9	1.6	1.6	2.2	2.2	3.0	3.1
10	1.6	1.6	1.8	2.0	2.4	2.9
12	1.2	1.4	1.8	2.1	2.6	3.2
14	1.4	1.4	1.8	1.9	2.4	3.0
16	2.0	2.2	2.3	2.7	3.1	3.8
18	2.2	2.3	2.7	2.9	3.7	4.5
20	2.2	2.4	2.7	3.1	3.7	4.8

Table 10

TRANSMISSION LOSS
(in decibels)

Goodyear Reinforced Elastomer Panel No. 378-3
Water temp: 15°C

Freq (kc)	Angle of Incidence					
	0-20°	25°	30°	35°	40°	45°
2	0.6	0.6	0.6	0.6	0.6	0.6
3	0.8	0.8	0.8	0.8	0.8	0.8
4	0.9	0.9	0.9	0.9	0.9	0.9
5	0.9	0.9	0.9	0.9	0.9	0.9
6	1.1	1.1	1.1	1.1	1.1	1.1
7	1.3	1.3	1.3	1.3	1.4	1.5
8	1.4	1.4	1.4	1.4	1.5	1.6
9	1.7	1.7	1.7	1.7	1.8	1.9
10	1.7	1.7	1.8	1.8	1.9	2.1
12	2.0	2.1	2.2	2.2	2.3	2.4
14	2.2	2.3	2.3	2.3	2.4	2.6
16	3.0	3.2	3.3	3.4	3.7	4.0
18	3.5	3.6	3.6	3.9	4.2	4.6
20	3.7	4.1	4.3	4.5	5.0	5.2